

S. A. E. Journal

JANUARY, 1933

INDEX TO VOLUME 31

JULY-DECEMBER, 1932



THE SOCIETY OF AUTOMOTIVE ENGINEERS, INC.
29 WEST THIRTY-NINTH STREET
NEW YORK CITY



28

S. A. E. JOURNAL

INDEX TO VOLUME 31, JULY-DECEMBER, 1932

Entries preceded by two letters refer to the news section which has a separate series of page numbers for each issue; entries not preceded by such letters refer to the so-called Transactions section, containing the papers and discussions, which has consecutive page numbers throughout the volume.

The following table indicates the pages contained in each monthly issue:

July J1 11-32, 265-304, 33-40	September Se 11-20, 345-384, 21-26	November No 11-24, 421-456, 25-38
August Ag 11-16, 305-344, 17-26	October Oc 11-20, 385-420, 21-32	December De 11-16, 457-492, 17-28

(D) indicates discussion published; (N) indicates mention in news section; (P) indicates paper published.

Author Index

AUTHOR	TITLE OF PAPER	PAGE
Ahrens, R. M.	Motorcoach Maintenance	(N) Oc 27
Aldrich, Elizabeth W.	Vapor Pressures of Automotive Diesel Fuels	(N) J1 17
Allen, H. H., and D. B. Brooks	Effect of Humidity on Engine Performance	(N) J1 26
Allen, H. H., and H. C. Dickinson	Conclusions from Headlight Research	(N) J1 24 (P) 339
Anderson, D. E.	Distribution of Oil in the Engine	(P) 299
Anderson, D. E.	Supplying Clean Oil for Engine-Block Tests	(P) 316
Arents, Chester A.	Automotive Fuels and Lubricants	(N) J1 35
Arnstein, Karl	Why Airships?	(N) De 21
Bachman, B. B.	Powerplant Needs of Trucks and Motorcoaches	(P) 435
Bachman, B. B.	Simplification of Control Needed	(P) 474
Barrie, A. A.	Federal Airways System from the Pilot's View-point	(N) No 32H
Bennet, L. C.	Airwheel or Super-Balloon Tires	(N) No 32F
Bert, F. W., Jr.	Insurance	(N) Oc 27
Bickell, J. P.	Vehicular and Personal Accident Prevention	(N) No 15
Bockius, Chris	Brake-Lining Problems	(N) J1 21
Boerlage, G. D., and J. J. Broeze	Ignition Quality of Diesel Fuels as Expressed in Cetene Numbers	(N) J1 17 (P) 283 (P) 338
Bogan, R. A. L.	Economies of Oil Reclamation	(N) No 31
Bramberry, Harry M., and Ralph R. Teetor	Piston-Ring Progress	(N) J1 20 (P) 323
Breese, R. P.	Vacuum-Type Brakes	(N) J1 14
Bridgeman, O. C., and H. C. Dickinson	Fundamentals of Automotive Lubrication	(P) 278 (P) 402
Bridgeman, O. C., and J. C. Molitor	Effect of Temperature on the Determination of Gum in Gasoline	(N) J1 25
Broeze, J. J., and G. D. Boerlage	Ignition Quality of Diesel Fuels as Expressed in Cetene Numbers	(N) J1 17 (P) 283 (P) 338
Brooks, D. B., and H. H. Allen	Effect of Humidity on Engine Performance	(N) J1 26
Brown, W. C., and R. N. Falge	Development of Fixed-Focus Headlighting Equipment	(N) J1 24
Bujak, Joseph, and Charles Porter	The Determination of Graphical Methods for Obtaining Shear and Bending Moment in Structural Members under Combined Axial and Transverse Loads	(N) J1 35
Burr, R. G.	Anti-Truck Propaganda	(N) De 27
Carl, J. W., and H. M. Williams	Refrigerated Trucks	(N) No 14 (P) 457
Chenea, V. E.	Pan-American Air-Transport Operations	(N) J1 19
Condit, K. H.	Replacement of Obsolete Machines	(N) Oc 12 (N) No 27
Cottrell, James W.	The Use of Trailers with Motor-Trucks	(N) J1 12 (P) 317
Courtney, Frank T.	Air-Transport-Design Economy and Air-Transport Testing	(N) Ag 12 (P) 356
Craig, James	Prevention of Motorboat Fires and Explosions	(P) 303
Crane, H. M.	The Car of the Future	(N) No 32E
Damon, Ralph S., George A. Page, Jr., and Kendall Perkins	Economic Aspects of Transport-Airplane Design	(N) Se 12 (P) 475
Danse, L. A.	Electric-Furnace Cast Iron from the Metallurgist's Viewpoint	(N) De 19
Darrow, Burgess	Pneumatic Tires-Old and New	(N) No 32A (N) No 32G (P) 438
Davies, J. M.	An Instrument for the Quick and Accurate Measurement of Tractor Field Performance	(N) De 21
Dennis, Van W.	Reducing Fleet Maintenance Costs	(N) Oc 27
Dickinson, H. C., and H. H. Allen	Conclusions from Headlight Research	(N) J1 24 (P) 339
Dickinson, H. C., and O. C. Bridgeman	Fundamentals of Automotive Lubrication	(P) 278 (P) 402
Edgar, Dr. Graham	The Automotive Engine and Its Fuel	(N) No 32A (P) 461
Falge, R. N., and W. C. Brown	Development of Fixed-Focus Headlighting Equipment	(N) J1 24
Favary, Ethelbert	High-Compression Engines	(N) De 21
Finn, C. C.	Highways and Taxation in the State of Washington	(N) Oc 27

AUTHOR	TITLE OF PAPER	PAGE
Fisher, J. B.	Adjusting Engineers to the Times	(P) 474
Fisher, J. B.	Bearing Metals for Heavy-Duty Engines	(P) 402
Fisher, J. B.	Factors Controlling Gasoline-Engine Design and Development	(N) No 32H
Fisher, J. B.	Improvements in Cylinder Iron	(P) 437
Fisher, J. B.	Materials for Crankshafts	(P) 466
Ford, Louis R.	Reasons Hindering Wider Adoption of Diesel Engines	(N) De 20
Fralick, F. L.	Body-Die Development	(N) Jl 18 (N) Oc 26
Frazer, J. W.	Bodies Considered from the Car Buyer's Viewpoint	(P) 294
Frudden, C. E.	Use of Tractor Equipment on the Mississippi River Levees	(P) 300
Gazley, Richard C.	Late Developments in Airplane Stress-Analysis Methods and Their Effect on Airplane Structures	(N) Se 11 (P) 345
Glynn, F. K.	Fleet Costs	(N) De 22
Hageboeck, A. E., and W. R. Jennings	Electric-Furnace Cast Iron from the Foundry Viewpoint	(N) De 19
Hardy, F. I.	Control of Motor-Vehicle Transport Operations	(N) No 17 (P) 436
Harris, Luther	Air-Transport Maintenance Problems from the Service Viewpoint	(P) 327
Herman, F. W.	Factors Governing Design of an Army Observation Airplane	(N) No 32H
Hoar, Everett	Regulations for Motor-Truck Operators in Canada	(N) No 15
Hoge, William L.	Wood in Automobile Bodies	(P) 304
Hook, G. T.	Economies of Oil Reclamation	(N) No 31
Horning, H. L.	Research	(N) No 32H
Jennings, W. R., and A. E. Hageboeck	Electric-Furnace Cast Iron from the Foundry Viewpoint	(N) De 19
Johnson, S., Jr.	Air Brakes	(N) Jl 13
Johnson-Tighe, H.	Use of Employee-Owned Cars in Business	(N) No 31
Kelting, H. C.	Bad Conditions Created by State Vehicle Laws	(P) 444
Kelting, H. C.	How Motor-Truck Operators Meet Regulation	(N) No 15
King, R. D.	Selling Motor-Truck Transportation	(N) No 19
Kranick, F. N. C.	Some Economic Aspects of General-Purpose Tractors	(N) De 20
Kuttner, Julius	Diesel-Engine Injection Systems	(N) Jl 34
Lake, Thomas A. Edison	A New Type Pontoon Hydroplane Boat	(N) De 22
Lang, C. E.	Justifying Motor-Truck Transportation	(P) 425
La Schum, E. E.	Fleet Operation	(N) No 32D
Lee, John G.	Relation of Design to Airplane Maintenance	(P) 412
Lemon, B. J.	Judging Super-Balloon Tires	(N) Jl 22 (N) 32G (P) 403
Lewis, George W.	Aeronautic Patents and the Work of the Patents and Design Board	(N) No 36
MacCormack, J. C.	Methods of Vaporization and Atomization	(N) Jl 34
MacDonald, Thomas H., and J. T. Thompson	Legislative Regulation of Motor-Vehicles	(N) No 32 (P) 421 (D) 485
Magnusson, Prof. Edward C.	Nature of the Electric Spark	(N) De 23
Main, F. L.	Brake-Drum Metallurgy	(N) Jl 21 (P) 330
Maurer, L. F.	Manufacturing Equipment Required To Meet the Designer's Needs	(N) Oc 11 (N) No 22 (P) 465
McIntyre, Lewis W.	Driver Accident Repeaters	(P) 302
McKee, J. H.	Hollow-Steel Propellers	(N) Se 12
McKee, T. R., and S. A. McKee	Journal-Bearing Friction in the Region of Thin-Film Lubrication	(N) Jl 25 (P) 371
Miller, R. A.	Plate Glass Making	(N) De 19
Molitor, J. C., and O. C. Bridgeman	Effect of Temperature on the Determination of Gum in Gasoline	(N) Jl 25
Moses, B. D.	Basic Demand Requirements for Farm Tractors	(N) De 21
Neely, Frederick R.	Analysis of Aviation Accidents	(N) De 20
Newill, E. W.	Recent Developments in Mechanical Refrigeration	(N) De 20
Orr, J. M.	Use of Employee-Owned Cars in Business	(N) No 31 (N) De 22
Page, George A., Ralph S. Damon and Kendall Perkins	Economic Aspects of Transport-Airplane Design	(N) Se 12 (P) 475
Parkin, J. H.	Importance of Aviation in Canada	(P) 355
Paton, Clyde R.	Frame Design and Front-End Stability	(N) Jl 20 (P) 305
Pellett, D. L.	The Application of Photoelasticity to the Study of Indeterminate Truss-Stresses	(P) 469
Perkins, Kendall, Ralph S. Damon, and George A. Page	Economic Aspects of Transport-Airplane Design	(N) Se 12 (P) 475

Abbreviations Used:—Ag—August Journal news section; (D) indicates discussion published; De—December Journal news section; Jl—July Journal news section; (N) indicates mention in news section; No—November Journal news section; Oc—October Journal news section; (P) indicates paper published; Se—September Journal news section.

AUTHOR	TITLE OF PAPER	PAGE
Piersol, James V.	Airplane Requirements for Newspaper Reporting Work (N) De 19	
Porter, Charles, and Joseph Bujak	The Determination of Graphical Methods for Obtaining Shear and Bending Moment in Structural Members under Combined Axial and Transverse Loads (N) J1 35	
Potter, A. A.	Research in Engineering Colleges (P) 468	
Prescott, Ford L.	Indicators As a Means of Improving Aircraft-Engine Performance (N) Se 12 (P) 361 (P) 402	
Prosser, R. D.	Current Applications of Cemented-Carbide Tooling (N) Oc 11	
Ramsey, R. P.	Design Factors and Combustion Control as They Influence the Automotive Diesel's Future (N) J1 17	
Ray, James	Experiences with the Autogiro (N) No 32G	
Robertson, Thomas E.	Automotive Patents (N) No 36	
Robinson, L. B.	Highway Lighting To Reduce Accidents (P) 344	
Rosen, J.	Wind-Tunnel Tests on Autogiro Vanes (N) No 32G	
Scaife, A. J.	The Burden of Ruinous Taxation (N) Oc 14	
Schon, Pierre	Effect of Legislation on Motor-Vehicle Design and Operation (N) No 32 (P) 426	
Schwartz, Alfred	Fuel Oil Is the Fuel for Marine Engines (N) J1 34	
Schwitzer, Louis	Engine Cooling (P) 378	
Schwitzer, Louis	Superchargers on Passenger-Car and Commercial-Vehicle Gasoline Engines (N) De 23	
Scragg, George H.	Obstacles to Motor-Truck Development (N) No 32G	
Smith, Eleanor	Women and Aviation (N) J1 35	
Smith, Richard S.	Heat-Treatment of Alloy Steels (N) Ag 19	
Spring, F. S.	Where Do We Go from Here? (N) J1 18	
Squier, Carl B.	Higher Air Speed at Less Cost (P) 384	
Stanley, F. C.	Brake-Lining Problems (N) J1 21	
Starbuck, W. D. L.	Radio as a Factor in Aeronautic Safety (N) De 20	
Steele, Marvin J.	High-Performance Aircraft Engines of the World and Their Marine Adaptation (N) No 32F	
Stevens, H. H.	Failure of Distribution System (N) No 16	
Stewart, W. J.	Toronto Police and Transportation System (N) No 16	
Stout, William B.	What Modern Automobiles Could Be (N) J1 11 (N) Oc 28 (N) No 32H	
Strehlow, Walter F.	Farm Tractors and Low-Pressure-Air Tires (N) De 20	
Sunnen, Joseph	Honing in All Its Phases (N) J1 34	
Taub, Alex	How the Design Engineer Views Manufacturing (N) Oc 11 (N) No 22 (P) 385 (D) 467	
Taub, Alex	Value of Crankshaft Counterweights (P) 316	
Taylor, C. F.	Bending Moments in the Master Rod of a Radial Aircraft Engine (P) 488	
Teetor, Ralph R., and Harry M. Bramberry	Piston-Ring Progress (N) J1 20 (P) 323	
Thompson, J. T., and Thomas H. MacDonald	Legislative Regulation of Motor-Vehicles (N) No 32 (P) 421 (D) 485	
Tietjens, Dr. Oskar G.	A New High-Speed Watercraft (N) De 22	
Warner, Edward P.	The Rational Specification of Airplane Load Factors (D) 295	
Warner, John A. C.	Desires of the Motoring Public (N) No 32G	
Williams, H. M., and J. W. Carl	Refrigerated Trucks (N) No 14 (P) 457	
Winslow, K. T.	Tentative Classifications of Low-Volatility Tractor Fuels (N) De 23	
Winters, Herbert G.	Aerodynamics Applied to Present-Type Bodies (N) J1 22 (N) No 32F	
Wise, William F.	Precision Boring (N) No 32F	
Wolf, Austin M.	Free-Wheeling Devices and Their Control (N) J1 21 (P) 265 (P) 338 (D) 384	
Wolf, Austin M.	Six-Wheel Trucks (N) No 32C (P) 387 (P) 437 (D) 486	
Woolson, H. T.	Electric-Furnace Cast-Iron from the Designing Engineer's Viewpoint (N) De 19	
Zand, Stephen J.	Vibration of Instrument-Boards and Airplane Structures (N) Se 11 (P) 445	

Abbreviations Used:—Ag—August Journal news section; (D) indicates discussion published; De—December Journal news section; J1—July Journal news section; (N) indicates mention in news section; No—November Journal news section; Oc—October Journal news section; (P) indicates paper published; Se—September Journal news section.

Discusser Index

DISCUSSEER	PAGE	DISCUSSEER	PAGE	DISCUSSEER	PAGE
Akerman, John D.	297	Horine, M. C.	460, 463, 485, 486	Shields, J. W.	400, 402
Bachman, B. B.	486	Hunt, J. H.	410	Short, Mac	296, 298
Baumgartner, W. J.	400	Johnson, W. M.	343	Smith, T. C.	464, 485, 487
Berchold, W. E.	329, 420	Johnston, Paul S.	420	Spelman, R. H.	402
Brown, W. C.	342	Jones, R. B.	322	Stayer, Col. E. S., U. S. A.	400
Caldwell, Sidney M.	444	Klikoff, W. A.	298	Taub, Alex	468
Church, H. D.	400	Lee, John G.	420	Tea, C. A.	314
Cottrell, James W.	486	Lemon, E. J.	411	Tuttle, J. C.	410
Eksergian, C. L.	336	MacCart, Lieut-Com. R. D., U. S. N.	298	Upton, Ralph H.	296
Forbes, D. P.	338	MacDonald, Thomas H.	492	Van Halteren, A. S.	335
Franzen, Tore	410	Main, F. L.	338	Walker, John	322
Gazley, Richard C.	297	Marshall, R. C.	329, 418, 420	Warner, Edward P.	295, 297, 298, 419
Gemmer, G. A.	400	Mock, Richard M.	329	Wheat, T. E. M.	315
Gordon, William R.	486	Nash, C. B.	400	White, S. C.	384
Graham, Dr. Edgar	464	Newell, Joseph S.	295	Wiggers, J.	400
Harrison, R. E. W.	465, 467	Page, George A., Jr.	419	Winchester, J. F.	485
Henderson, R. T.	402	Pierce, C. A.	400	Wollensak, A. C.	400
Holstrom, J. G.	400	Reese, W. D.	400	Wolf, Austin M.	487
		Rhode, Richard V.	297, 298	Wright, T. P.	295, 297

Subject Index

	PAGE		PAGE
A		Aircraft Design and Construction (concluded)	
Accelerometer, Vibrograph Compared with	447	Spring	450
Accidents and Accident Prevention		Standardization	Jl 30
Aircraft		Vibration preventives	414; 449, 450
Causes classified	295; 413; De 20	Landing gear	
Engine factors, single vs. multi-engine	358; 480	Improvement desired	413
Structural factors	413	Maintenance design requirements	327; 415, 418
Parts responsible	295	Retractable vs. permanent	358; 418
Percentage of total	De 20	Speed affected by	384
Statistics		Maintenance relation to	
Automotive		AIR-TRANSPORT MAINTENANCE PROBLEMS FROM THE	
Design factors, width	427	SERVICE VIEWPOINT	327
Driver responsibility	302	RELATION OF DESIGN TO AIRPLANE MAINTENANCE	412
Insurance, liability	Oc 27	Maintenance design requirements	327; 412
Legislation as preventive	Se 18; No 15	Structural type effects	478
Statistics	432; De 27	Makes	
Tire effects, super-balloon	Jl 23; 403, 408; 441	Curtiss	418
Motorboat, fire	303	General Aristocrat	418
PREVENTION OF MOTORBOAT FIRES AND EXPLOSIONS	Jl 34	Pilgrim	418
Fuel effects, low volatility	303	Metal	
Galley stove hazard	303	Maintenance costs affected by	478
Gasoline tank, precautions in filling	432; De 27	Weight, excessive	358
Motorcoach statistics	432; De 27	Monoplane	
Motor-truck statistics	432; De 27	Commercial transport use	481
Aircraft Design and Construction		Stress analysis	347
Airfoil design effects on lift	No 36	Propellers	
Aluminum used in	327	Blade number	456
Army maintenance specifications	412, 420	Geared vs. direct-driven	456
Automotive compared with	Oc 28	Metal development	Ag 11; Se 12
Biplane as commercial transport	481	Vibration affected by	456
Cabin		Size, commercial transport requirements	357; 480, 481
Commercial transport	328; 358; 416	Specifications, maintenance requirements in	415, 419, 420
Maintenance design requirements	328; 416	Structure	
Cockpit design effects on maintenance	416	Failures due to	295; 413
Commercial transport		Maintenance costs affected by	478
AIR-TRANSPORT-DESIGN ECONOMY AND AIR-TRANSPORT		Stressed vs. non-stressed skin	296
TESTING	Ag 12; Se 12, 356	Wear reduction details	413
THE ECONOMIC ASPECTS OF TRANSPORT-AIRPLANE DESIGN	Ag 12; Se 12; 475	Tail surface maintenance design requirements	416, 418
Biplane merits	481	Tail wheel, swiveling, recommended	414
Cabin	328; 358; 416	Weight	
Design requirements	356	Maintenance relation to	327
Earning factors	476, 482	Metal	358
Engine effects		Vibration frequency relation to	454
Power requirements	480, 482	Wiring, fatigue failure prevention	414
Single vs. multi-engine	358; 481	Wings	
Monoplane merits	481	Area, speed relation to	481
Seats, number of	Se 24; 483	Bracing, external vs. internal	358
Size	357; 480, 481	Maintenance design requirements	416
Control		Multiple	No 36
Improvements desired	360	(See also Accidents and Accident Prevention, Aircraft; Aircraft Operation and Performance; Aviation; Bearings, Aircraft; Brakes, Aircraft; Engines, Aircraft; Supercharging, Aircraft, and Wheels, Aircraft)	
Maintenance design requirements	328, 329	Aircraft Operation and Performance	
Fabric covering	327	Angle of attack, load relation to	296, 297
Fuel tank		Comfort factors	481
Location as stress factor	350	Commercial transport	
Maintenance design requirements	328	Efficiency, aerodynamic	480
Fuselage		Speed	357, 384, Se 24; 477, 482
Monocoque maintenance design requirements	418	Testing	353
Stress resistant design features	347	Costs	
Helicopter development	No 36	Efficiency, aerodynamic, effects	479, 482
Ice formation preventives	No 36	Engine effects	
Instrument-board mounting		Power	482
Plastic-material shock-absorber	452		

Abbreviations Used: Ag—August Journal news section; De—December Journal news section; Jl—July Journal news section; No—November Journal news section; Oc—October Journal news section; Se—September Journal news section.

	PAGE		PAGE
Aircraft Operation and Performance (continued)		Aircraft Operation and Performance (Concluded)	
Single vs. multi-engine	384; 412, 420	Engine speed relation to	454
Example	412; 482	Instrument	
Factors affecting	420; 476, 477, 482	Examples	448
Passenger seats, number of	484	Mounting as cure	449, 450
Speed effects	384; 479, 482	Measurements of	454
Depreciation	412, 420; 478	Propeller as source	455
Diving, load relation to	295, 297	Riding comfort affected by	454
Efficiency, aerodynamic		Testing	446, 453, 454
Commercial transport types	480	Wear, design for reduction of	413
Engine effects, single vs. multiple	480	Wing	
Operating costs affected by	479, 482	Rib stresses	471
Engine effects		Spar stresses	348
Efficiency, aerodynamic, affected by	480	(See also Accidents and Accident Prevention, Aircraft; Aircraft	
Operating costs affected by	384; 412, 420; 482	Design and Construction: Aviation; Engines, Aircraft; Instru-	
Safety affected by	480	ments, Aircraft; Riding-Qualities, Aircraft, and Supercharging,	
Single vs. multiple	346, 384; 412, 420; 480	Aircraft)	
Stress analysis	346	Aluminum and Aluminum Alloys	
Fittings, stress analysis for	413	Aircraft use of	327
Heating	416, 418	Body use of, trailer	320
Insurance rates	478, 481	Die-casting standardization	Jl 30
Inverted flight load factors	298	Insulation, heat	457
Landing-gear stress analysis	351	Army	
Lighter-than-air		Aircraft design maintenance specifications	412, 420
Commercial transport	De 21	Coast defense batteries	Se 22
Speed	No 32F	Indicator, Air Corps	367, 368
Load factors		Motor-truck types	Se 22
THE RATIONAL SPECIFICATION OF AIRPLANE LOAD		Six-wheel vehicles	398, 400
FACTORS	295	Automobile Design and Construction	
Air conditions affecting		Aircraft compared with	Oc 28
Horizontal gusts	295, 298	Appearance, tire effects, super-balloon	403, 405, 410, 411
Vertical gusts	296, 297, 298	Center of gravity, higher needed	Oc 28
Angle of attack relation to	296, 297	Future predicted	No 32E
Diving effects	295, 297	Height, legislative restrictions on	422, 428, No 32, No 32A
Inverted flight	298	Length, legislative restrictions on	422, 429, No 32, No 32A; 492
Pilot control force as criterion	295, 296, 297, 298	Production, cooperation with	385; 465, 467, 468
Stability effects	299	Progress	De 16
Structural effects, stressed vs. non-stressed skin	296	Racing, rules for	Jl 35
Unsymmetrical conditions	346	Radio	
Maintenance		Battery current requirements	No 26
AIR-TRANSPORT MAINTENANCE PROBLEMS FROM THE		Ignition shielding requirements	No 26
SERVICE VIEWPOINT	327	Mounting	No 26
RELATION OF DESIGN TO AIRPLANE MAINTENANCE	412	Standardization	No 26
Brake	327; 415	Rigidity	
Cabin	328; 416	Measurement of	307, 314, 315
Cockpit	416	Shimmy affected by	308, 314
Control	328, 329; 416	Selling points	Jl 18; No 21, No 32E, No 32G
Cost	329; 412, 420; 478	Small car possibilities	No 32E
Design requirements	412, 415, 419, 420	Specifications, ideal	Jl 13
Fuel tank	328	Streamlining	
Landing gear	327; 415, 418	Aerodynamic principles of	Jl 23
Parts' requirements for	413	Teardrop design criticized	Jl 11
Structural type effects	478	Wind resistance decreased by	Jl 24
Tail	416	Tire effects, super-balloon	Jl 23; 403, 404, No 32F
Tools	329	Weight	
Wheel	327	Legislative restrictions on	425, 432, No 32A
Wings	327; 416	Reduction needed	Jl 11; Oc 28; No 22
Metal, stressed-skin, load factors for	296	Shimmy affected by	Jl 20; 313, 314
Obsolete, replacement time for	483	Unsprung	
Physical reaction to	No 32G	Shimmy affected by	Jl 20; 313, 314
Pilots		Tire wear affected by	Jl 20
Control force available	295, 296, 297, 298	Width, legislative restrictions on	421, 427, No 32; 492
Test, requirements for	359	(See also Accidents and Accident Prevention, Automotive; Auto-	
Women	Jl 35	mobile Operation and Performance; Axles; Bodies; Brakes;	
Propellers, aircraft vibration affected by	455	Clutches; Engine Design and Construction; Foreign Design and	
Safety, single vs. multi-engine	480	Operation; Frames; Headlighting; Motorcoach Design and Con-	
Speed		struction; Motor-Truck Design and Construction; Riding Qualities;	
Commercial value of	357, 384, Se 24; 477, 482	Shock-Absorbers; Six-Wheel Vehicles; Springs, Suspension;	
Landing-gear effects	384	Steering Systems; Tires and Rims; Transmissions and Wheels)	
Operating costs affected by	384; 479, 482	Automobile Operation and Performance	
Wing area relation to	481	Acceleration, super-balloon tire effects	407
Stability		Associations interested in	Ag 16; Oc 14; No 29
Load factors affected by	299	Cost reduction necessary	No 21
Testing	360	Drivers	
Stresses		Instruments used by	Jl 19, 294
LATE DEVELOPMENTS IN AIRPLANE STRESS-ANALYSIS		Traffic law violations	302
METHODS AND THEIR EFFECT ON AIRPLANE STRUC-		Impacts	
TURES	Ag 12; Se 11, 345	Road roughness effects	423, 424
THE APPLICATION OF PHOTOELASTICITY TO THE STUDY		Speed effects	422, 423
OF INDETERMINATE TRUSS-STRESSES	469	Insurance, liability, rates	Oc 27
Analysis, consistent deflection method	350	Interstate, legislative restrictions on	421
Fittings	352	Lubrication and lubricants	
Landing gear	351	FUNDAMENTALS OF AUTOMOTIVE LUBRICATION	278
Struts, auxiliary	354	Makes	
Tail surfaces	350	Buick	405
Testing, photoelastic method	469	Cadillac	439
Unsymmetrical conditions, effect of	345	Chevrolet	404
Wing		De Soto	Jl 23; 404, 405, 411
Rib	471	Ford	404
Spar	348	Graham Paige	404, 405
Testing		Plymouth	404
Stability	360	Rockne	404, 405
Stresses	469	Number in operation	
Transport	359	Decrease in	Oc 14; 426
Vibration	446, 453, 454	Distribution of	Oc 14
Tires		Taxation effects on	Oc 14; 426
Brakes affected by	440	Roadability	
Super-balloon	440	Improvement needed	No 32E
Ventilation, pilot control of	328	Tire effects, super-balloon	408
Vibration		Roads affected by	
VIBRATION OF INSTRUMENT-BOARDS AND AIRPLANE		Impacts	422, 423, 424
STRUCTURES	Ag 11; Se 11; 445	Motor-truck compared with	425
Bodily sensation as measure of	453	Wear	434
Engine as source	454, 455	Service performed by	No 20
Frequency		Skidding, tire effects	Jl 23, 410
Aircraft weight relation to	454		

Abbreviations Used: Ag—August Journal news section; De—December Journal news section; Jl—July Journal news section; No—November Journal news section; Oc—October Journal news section; Se—September Journal news section.

	PAGE		PAGE
Automobile Operation and Performance (Concluded)		Bearings (Concluded)	
Speed		Performance characteristics	278, 282
Higher predicted	No 32E	Lock nut and washer standardization	No 25
Legislative restriction on	Jl 31; 422, 430	Metric conversion factor standardization	Jl 30
Road impacts affected by	422, 423	Steering-system use of	400
Tire effects, super-balloon	407	Wear factors	304
Visibility distance affected by	339, 341	Clearance, friction affected by	280; 402
Taxation		Engine	
Amount paid	Oc 14	Failure, temperature as cause	No 36
Associations to oppose	Ag 16; Oc 14; No 29	Loads, crankshaft counterweights as reduction means	316
Registrations affected by	Oc 14; 426	Performance characteristics	278
Road construction costs paid by	Oc 15, Oc 27; No 20, No 32; De 27	Power dissipated in	280
Testing		Temperature	
Rigidity	307, 314, 315	Equation for determination of	281
Vibration	310	Failure cause	No 36
Traction, super-balloon tire effects	Jl 23; 409; 441	Heat dissipated in	280
Wind resistance, streamlining effects	Jl 24	Maximum allowable	281
(See also Accidents and Accident Prevention, Automotive; Automobile Design and Construction; Bodies; Brakes; Clutches; Engine Operation and Performance; Frames; Headlighting; Legislation; Lubricant and Lubrication; Motorcoach Operation and Performance; Motor-Truck Operation and Performance; Riding-Qualities; Shimmy; Shock-Absorbers; Springs, Suspension; Tires and Rims; Transmissions, and Wheels)		Friction	
Automotive Industry		JOURNAL-BEARING FRICTION IN THE REGION OF THIN-FILM LUBRICATION	Jl 25; 371
College research relation to	468	Bearing surface effects	Jl 25; 376
Importance of	Oc 14	Clearance effects	280; 402
Price decrease	Oc 14	Equation for determination of	Jl 25; 376
Production decrease	Oc 14	Length-diameter ratio effects	260
Aviation		Metal type effects	Jl 25; 372, 375, 376
Aeronautical Chamber of Commerce of America maintenance information forum	420	Oil viscosity effects	Jl 25, 278; 371, 374, 376
Air conditions		Pressure effects	Jl 25; 371, 373, 376
Horizontal gusts	295, 298	Rubbing speed effects	Jl 25, 278; 371, 373, 376
Vertical gusts	296, 297, 298	Testing	Jl 25; 372, 373, 376
Canadian	355	Thick-film lubrication	278
Costs		Thin-film lubrication	Jl 25; 371
Commercial		Length-diameter ratio, friction affected by	280
Aircraft relation to		Lubrication	
THE ECONOMIC ASPECTS OF TRANSPORT-AIRPLANE		Fundamentals	278
DESIGN	Ag 12; Se 12; 475	Oil viscosity, friction affected by	Jl 25, 278; 371, 374, 376
Load-carrying importance	357	Thick film	278
Passenger seats	Se 24; 483	Thin film	Jl 25; 371
Retirement period	483	Metal	
Size requirement	357; 480, 481	Babbitt	
Example	482	Friction affected by	Jl 25; 372, 375, 376
Factors affecting	476, 477, 482	Improvement needed	402
Speed effects	384; 479, 482	Physical properties	402
Development	Jl 19; 355, 356	Bronze, friction affected by	Jl 25; 372, 375, 376
Earnings, factors affecting	Se 12; 476, 482	Copper lead, merits and physical properties	402
Fares	477	Friction affected by	Jl 25; 372, 375, 376
Future	Se 14	Surface conditions, friction affected by	Jl 25; 376
International	Jl 19	Pressure, friction affected by	Jl 25; 373, 376
Lighter-than-air possibilities	No 32F; De 21	Rubbing speed, friction affected by	Jl 25, 278; 371, 374, 376
Newspaper use of	De 19	Bibliographies	
Revenue, factors affecting	477	Iron alloys	383
Schedules	384	Tires, pneumatic	444
Speed		Bodies	
Costs affected by	384; 479, 482	BODIES CONSIDERED FROM CAR BUYER'S VIEWPOINT	294
Value of	357, 384, Se 24; 477, 482	Glass	
Photography, vibration effects	456	Anti-glare	De 19
Radio		Non-shatterable	De 19
Battery current requirements	328	Improvement needed	De 13
Frequencies assigned to	De 20	Instrument-board	Jl 19, 294
Ignition shielding	329	Insulation	
Transatlantic, lighter-than-airship	De 21	Exhaust gas fume prevention	De 18
(See also Aircraft Design and Construction; Aircraft Operation and Performance; Engines, Aircraft, and Instruments, Aircraft)		Refrigerator	No 15; 457
Axles		Life, mounting method effects on	308
Rear		Metal, production	
Differential		Design relation to	Oc 26
Inter-axle	390, 391, 394, 395, 400, 402, No 32C, No 32D; 486, 487	Die making for	Jl 19; Oc 26
Locking	391, 400	Motorcoach, exhaust gas fume insulation	De 18
Three in one	389	Motor-truck	
Reduction gear		Refrigerator	
Bevel gear	390, 391	Construction details	No 15; 458
Worm gear	390	Insulation	No 15; 457
Six-wheel vehicle		Windshield hinging as ventilation source	No 13; De 18
Differential		Mounting methods, life affected by	308
Inter-axle	390, 391, 394, 395, 400, 402, No 32C, No 32D; 486, 487	Noise	
Locking	391, 400	Design prevention of	Oc 31
Three in one	389	Wood, superiority of, as insulator	304
Final-drive types	388, 394, 396, 400; 486, 487	Production	
Lubrication	390	Metal	
Reduction gear		Design relation to	Oc 26
Bevel gear	390, 391	Die making for	Jl 19; Oct 26
Worm gear	390	Wood	304
Spacing, legal restrictions on	424	Radiator mounting, shimmy affected by	Jl 20; 310
Trailer attachment type	393	Rigidity	
		Measurement of	307
Batteries, Storage		Shimmy affected by	308
Aircraft, current requirements	328	Selling points	294
Radio current requirements	328; No 26	Streamlining, trailer	320
Bearings		Structure, shimmy affected by	305, 307
Aircraft		Trailer, streamlining	320
Ball and roller	413	Types	
Size increase recommended	329	Public demand for	299
Ball and roller		Shimmy affected by	Jl 20; 305, 312
Aircraft use of	413	Upholstery and fittings	294
Friction	278, 282	Wood	
Loading	304	Chemical decay prevention	304
		Construction details	304
		Glues used	304
		Sound and shock absorption superiority	304
		Brakes	
		Air	
		Compressor design	Jl 13
		Parts enumerated	Jl 13
		Trailer use of	Jl 14
		Aircraft	
		Maintenance, design for	327
		Tire effects, super-balloon	440

Abbreviations Used: Ag—August Journal news section; De—December Journal news section; Jl—July Journal news section; No—November Journal news section; Oc—October Journal news section; Se—September Journal news section.

9

Abbreviations Used: Ag—August Journal news section; De—December Journal news section; Jl—July Journal news section; No—November Journal news section; Oc—October Journal news section; Se—September Journal news section.

January, 1933

	PAGE		PAGE
Engine Operation and Performance (Concluded)		Engines, Diesel (Concluded)	
Cycles, Schwartz	Jl 34	Theory	
Efficiency, thermal, Diesel engine compared with gasoline	Jl 18	Nuclear theory	283, 290; 338
Fuel consumption		Oxygen combination with cracking products	288, 290
Compression ratio effects	No 32A; 461, 462	Ignition lag	
Humidity effects	Jl 26	Air pressure and temperature effects	285
Tire effects, super-balloon	407	Fuel temperature effects	285
Fuel feeding, vapor-lock road tests	Jl 26	Importance of	283, 292
Heat balance, cooling relation to	378	Methods of shortening	293
High compression operating factors	De 21	Makes	
Hill climbing ability, compression ratio effects	No 32A; 462	Deutz	286
Humidity, power and fuel consumption affected by	Jl 26	Gardner	286
Lubricants and lubrication		Junkers	Se 15
FUNDAMENTALS OF AUTOMOTIVE LUBRICATION	278	Kromhout	291
Block test system	316	Oberhaensli	Jl 34
Fundamentals of	278	Saurer-Acro	287
Oil temperature		Thomassen-Ricardo	287
Bearings affected by	402	Operating defects, freedom from	Jl 17, Jl 18
Pump as heating means	No 36	Size, economic	Jl 17
Water-jacket design effects	382	Smoothness of operation, air pressure effects	285
Makes		Two-stroke cycle possibilities	Se 15
Buda	Jl 34	(See also Cylinders; Detonation; Engines, Marine; Engines, Motorcoach; Engines, Motor-Truck, and Fuels, Diesel)	
Buick	Jl 34	Engines, Marine	De 20
Ford	Jl 34	Diesel reliability	Jl 34
Nova	Jl 34	Fuel, gas oil	303
Palmer	Jl 34	Fuel feeding, gravity preferred	
Noise, cooling-fan	380	Engines, Motorcoach	
Power		Braking use of	435
Compressed air injection effects	Jl 34	Design requirements	435
Compression ratio effects	No 32A; 461, 462	Diesel possibilities	435
Fan consumption of	379, 380	Exhaust	
Humidity effects	Jl 26	Dilution as ventilation aid	No 14
Piston and valve cooling effects	No 32B; 463	Manifold leak preventives	No 14, No 28; De 17, De 18
Smoothness, improvement in	No 32E	Pipe location	No 28; De 17
Speed, blowby affected by	324	Gas fume source	No 13, No 28; De 17
(See also Batteries, Storage; Bearings, Carbureters and Carburetion; Connecting-Rods; Crankcases; Crankshafts; Cylinders; Detonation; Engine Design and Construction; Engines, Aircraft; Engines, Diesel; Engines, Marine; Engines, Motorcoach; Engines, Motor-Truck; Foreign Design and Operation; Ignition; Induction; Pistons; Supercharging, and Valves and Valve Gear)		Maintenance, cleaning important	No 14, No 28; De 17
Engineers and Engineering		Size requirements	435
Field contact needed	474	(See also Carbureters and Carburetion, Motorcoach, and Induction, Motorcoach Engine)	
Functions of	474	Engines, Motor-Truck	
Legislation, relation to	De 27	Army types	Se 22
Production contact needed	385; 465, 467, 468	Braking use of	435
Engines, Aircraft		Design requirements	435
Accessibility	417	Diesel	
Aircraft vibration affected by	455	Maintenance cost	Jl 18
Commercial transport requirements	358; 480, 482	Possibilities of	435
Cost	479	Exhaust pipe location	No 13; De 18
Cylinder types		Lubrication, oil changing periods	De 23
In-line, commercial use of	358	Maintenance cost, Diesel and Otto cycle compared	Jl 18
Radial, master connecting-rod bending stresses	488	Size requirements	435
Depreciation	478		
Exhaust		F	
Back pressure effects	268	Finishes, Aircraft, Weight of	413
Manifold design requirements	415, 417	Fleet Operation	
Fuel consumption	478	Associations interested in	Ag 16; Oc 14; No 29
Fuel feeding, fatigue failure prevention	414	Control, centralized vs. decentralized	No 32D, No 34
High performance development needed	No 32F	Cost accounting, importance of	No 17, No 18, No 19; De 22
Lubricants and lubrication		Cost reduction means	Oc 27
Oil consumption	478	Employee-owned cars	No 31; De 23
Pressure cycle in	368	Lubrication, oil reclamation in	Oc 27, Oc 28; No 31
Maintenance		Maintenance, owner vs. commercial shop	Oc 27, Oc 28
Cost	329	Personnel manager, selection and duties	No 32D
Design specifications for	415, 417	(See also Automobile Operation and Performance; Motorcoach Operation and Performance; Motor-Truck Operation and Performance, and Transportation)	
Factors affecting	478	Foreign Design and Operation	
Mounting effects	328	Aviation, commercial, Canadian	355
Makes, Wright	489	Legislation, motor-truck operation, Canadian	No 15
Mounting		Transmissions, free wheeling	276
Maintenance affected by	328	Frames	
Quick detachable	415, 417	FRAME DESIGN AND FRONT-END STABILITY	Jl 20; 305
Stresses affected by	348	Breakage, rigidity effects	315
Power		Rigidity	
Commercial requirements	480, 482	Breakage affected by	315
Operating costs affected by	482	Demand for	307
Specifications, maintenance requirements	415	Measurement of	307, 315
Speed, aircraft vibration relation to	454	Shimmy affected by	Jl 20; 308, 310, 315
(See also Batteries, Storage; Connecting-Rods; Ignition, Aircraft and Supercharging, Aircraft)		Six-wheel vehicle requirements	397
Engines, Diesel		Torsional vibration of, in shimmy	Jl 20; 306; 314
Automotive		Welded, development needed	465
Possibilities of	Ag 15; Se 15	Fuels	
Production cost	De 20	Alcohol, solubility of, in gasoline	Jl 26
Combustion		Diesel	
After-chamber design effects	Jl 18	Blends, ignition characteristics of	288, 289, 290
Combustion chamber types analyzed	293	Cost	No 36
Phases described	283	Ignition characteristics	
Turbulence effect	283, 292	IGNITION QUALITY OF DIESEL FUELS AS EXPRESSED IN CETENE NUMBERS	Jl 17, 283; 338
Compression pressure, ignition lag affected by	285	Blends, deducible from components	288, 289, 290
Efficiency, thermal, gasoline engine compared with	Jl 18	Characteristics affecting	284, 285, 287, 290, 291
Fuel consumption		Engine behavior affected by	286
Ignition quality of fuel effects	287	Ethyl nitrite effects	Jl 17
Specific	Jl 18	Formula for determination of	290
Fuel feeding		Nuclear theory of	283, 290; 338
Air and fuel temperature	285	Oil of turpentine effects	Jl 17
Design principles	293	Testing	
Ignition quality of fuel effects	286	Cooperative Fuel-Research method	Jl 17, 287
Nozzle carbonization	292	Engine tests	284; 338
Operating difficulties	Jl 17	Reference fuels used	286; 338
Hot bulb type, ignition problems in	291	Viscosity effects	284, 291
Ignition		Molecular structure, ignition qualities affected by	287
Factors affecting	292	Research	Jl 26, Jl 28
		Testing, ignition characteristics	
		Cooperative Fuel-Research method	Jl 17, 287

Abbreviations Used: Ag—August Journal news section; De—December Journal news section; Jl—July Journal news section; No—November Journal news section; Oc—October Journal news section; Se—September Journal news section.

INDEX TO VOLUME 31

11

	PAGE		PAGE
Fuels (Concluded)		Instruments	
Engine	284; 338	Aircraft	
Reference fuels used	286; 338	Altimeter	448
Vapor pressure	Jl 17, Jl 26	Compass	
Viscosity, ignition qualities affected by	284, 291	Mounting	449, 450
Gas oil, marine engine use of	Jl 34	Vibration	449
Heat capacity	461	Design difficulties	448
(See also Detonation, Fuel Factors, and Gasoline)		Deterioration	449
		Mounting	
		Plastic-material shock-absorbers	452
		Spring	450
		Vibration preventive	449, 450
		Pressure gage	449
		Vibration	
		VIBRATION OF INSTRUMENT-BOARDS AND AIRPLANE	
		STRUCTURES	Ag 11; Se 11; 445
		Design difficulties due to	448
		Deterioration due to	449
		Mounting as preventive	449, 450
		Testing	446
		Automotive, number of, used in driving	Jl 19, 294
		Gage, roller, for piston ring testing	Jl 20; 323, 326
		Oscillograph	362, 363
		Pedometer	310, 315
		Vibograph	446
		(See also Accelerometers and Indicators, Engine)	
		Inventions, Value of Not Realized	No 36
		L	
		Legislation	
		Associations for study of	Ag 16; Oc 14; No 29
		Engineers' relation to	De 27
		Functions of	421, 425, No 32; 485, 492
		Manufacturers' relation to	Se 18
		Motor-truck design and construction	
		Height	Jl 16
		Length	Jl 16
		Weight	Jl 17
		Width	Jl 16
		Motor-truck operation and performance	
		Axle loading	Jl 17; 423, 424, 432, N. 32; 492
		Canada	No 15
		Interstate	No 15, 444
		Lack of uniformity in	No 15
		Railroad relation to	Jl 12
		Motor-vehicle design and construction	
		LEGISLATIVE REGULATION OF MOTOR-VEHICLES	421, No 32; 485
		EFFECT OF LEGISLATION ON MOTOR-VEHICLE DESIGN	426, No 32
		AND OPERATION	
		American Association of State Highway Officials	421, 427
		recommendations	321, 431
		Brake	
		Height	422, 428, No 32, No 32A
		Lack of uniformity in	421, 425, 427, 435
		Length	422, 429, No 32, No 32A; 485, 492
		Weight	425, 432, No 32A
		Width	421, 427, No 32; 492
		Motor-vehicle operation and performance	
		Accident prevention	No 15
		Speed	Jl 31; 422, 430
		Restrictive, harmfulness of	No 20
		Six-wheel vehicle	
		Axle spacing	424
		Weight	388, 435
		Taxation	
		THE BURDEN OF RUINOUS TAXATION	Oc 14, Oc 20
		Amount paid	Oc 14
		Gasoline	
		Amount of	Oc 14, Oc 15
		Number of vehicles in operation affected by	Oc 14; 426
		Uniformity recommended	No 29
		Industrial recovery hampered by	Oc 14
		Motorcoach and motor-truck contribution to	De 27
		Road construction costs paid by	Oc 15, Oc 27; No 20, No 32; De 27
		Sales	Oc 14
		Trailer	
		Brake	321
		Lack of uniformity in	318, 322
		Railroad relation to	Jl 12
		Trains	Jl 16; 318, 322; 422, 429, No 32, No 32A; 485, 492
		Weight	435
		Lubricants and Lubrication	
		Extreme pressure test methods	Jl 27
		Oil reclamation	
		Cost	No 31
		Fleet operators' experience with	Oc 27, Oc 28; No 31
		Oil quality	No 31
		Testing, extreme pressure	Jl 27
		Viscosity-temperature relations	Ag 18
		(See also Automobile Operation and Performance, Lubricants and Lubrication; Bearings, Lubrication; Engine Design and Construction, Lubricating System; Engine Operation and Performance, Lubricants and Lubrication; Engines, Aircraft, Lubricants and Lubrication, and Transmissions, Lubricants and Lubrication)	
		M	
		Materials	
		Glass production	De 19
		Glue, body use of	304
		Metals	
		Cast iron	
		Alloy bibliography	383

Abbreviations Used: Ag—August Journal news section; De—December Journal news section; Jl—July Journal news section; No—November Journal news section; Oc—October Journal news section; Se—September Journal news section.

January, 1933

	PAGE		PAGE
Metals (Concluded)		Motor-Truck Operation and Performance (Concluded)	
Brake-drum material		Heating, exhaust method elimination urged	No 28
Jl 21, Jl 22; 332, 333, 335, 336, 338; De 19		Impacts	
Crankshaft material	No 30; De 16, 466	Tests	Jl 29
Electric furnace, advantages of	De 19	Tire effects, cushions, pneumatics and solid compared	423
Growth	437, No 32H	Insurance costs	425
Improvements in	437	Interstate, legislative restrictions on	No 15, 444
Machining, tungsten-carbide tools used in	Oc 12	Life, economic	No 32D
Physical properties	437	Maintenance	
Standards proposed	De 19	Costs	No 32D
Steel compared with	437	Inspection schedules, mileage basis	No 18, No 19, 436
Chromium as steel alloy	Ag 20	Operating costs affected by	436
Manganese as steel alloy	Ag 20	Overhaul schedules	436
Molybdenum as steel alloy	Ag 20	Records	No 18, No 19, 436
National Metals Congress and Exposition	Ag 12; Se 13; Oc 12	Manufacturers' relation to	No 17, No 18, No 19, 436, 437
Nickel as steel alloy	Ag 19	Number in operation	
Zinc, die casting alloys	Jl 30; Oc 11	Data on	317, 322
(See also Aluminum and Aluminum Alloys; Bearings, Metals; Corrosion and Corrosion Prevention; Heat-Treatment and Steels)		Distribution of	Oc 15
Motorboats		Overloading	444
PREVENTION OF MOTORBOAT FIRES AND EXPLOSIONS	303	Propaganda against	De 27
Fire preventive methods	303	Railroad, competition with	Oc 15
Gasoline tank, precautions in filling	303	Rating	
Galley stove, gas	303	Ability formula	Jl 15
Hull design		Capacity formula	Jl 15
Hydrofoil	De 22	Method confirmed	No 13
Pontoon-hydroplane	De 22	Refrigerator	
(See also Accidents and Accident Prevention, Motorboat and Engines, Marine)		Heat leakage	457
Motorcoach Design and Construction		Usage, extent	
Control simplification needed	474	Roads affected by	
Design requirements	435	Impacts	Jl 29; 423
(See also Bodies, Motorcoach; Brakes, Motorcoach; Engines, Motorcoach; Fleet Operation and Motorcoach Operation and Performance)		Passenger cars compared with	425
Motorcoach Operation and Performance		Thickness requirements	Oc 15, Oc 27
Driving technique, exhaust gas fumes affected by	No 13, No 28; De 17	Selling means	No 19
Heating		Speed, legislative restrictions on	422, 430
Exhaust method elimination urged	No 28; De 17, De 18	Taxation, amount paid	De 27
Hot water system	De 18	Tires	
Tubing design	De 18	Adjustments against sales	444, No 32B
Maintenance equipment and methods	Oc 27	Allowable axle loads affected by	423, 424
Mileage	Oc 27	Cushion, impacts affected by	439, 444, No 32B
Number in operation	Oc 27	Dual vs. single	423
Propaganda against	De 27	Impacts affected by	423
Speed, legislative restrictions on	422	Overloading	444, No 32B
Taxation, amount paid	De 27	Pneumatic	
Tires, pneumatic, heat effects on	443	Development of	439, 443
Ventilation		Impacts affected by	423
Air volumes required	No 29	Materials used in	443
Commercial value of	No 13, No 14; De 18	Size increase in	440
Equipment	No 29; De 17, De 18	Super-balloon possibilities	440
Exhaust gas dilution as aid to	No 14	Solid impacts affected by	423
Forced air system	No 13, No 28; De 17	Trip length	Oc 15
Gas fume causes	No 13, No 28; De 17	Vehicle selection	No 17, No 18, No 19, 436, 437
Report on	No 13, No 28; De 17	Ventilation	
(See also Bodies, Motorcoach; Brakes, Motorcoach; Engines, Motorcoach; Fleet Operation and Motorcoach Design and Construction)		Equipment	No 13; De 18
Motor-Truck Design and Construction		Exhaust pipe location effects	No 13; De 18
EFFECT OF LEGISLATION ON MOTOR-VEHICLE DESIGN	426, No 32	Report on	No 13, No 28; De 17
AND OPERATION	421, No 32; 485	Windshield as source	No 13; De 18
LEGISLATIVE REGULATION OF MOTOR-VEHICLES	Se 22	(See also Bodies, Motor-Truck; Brakes, Motor-Truck; Engines, Motor-Truck; Fleet Operation; Motor-Truck Design and Construction; Six-Wheel Vehicles, and Trailers)	
Army types	474		
Control simplification needed	435		
Design requirements	435		
Height, legislative restrictions on	Jl 16; 422, 428, No 32, No 32A		
Length, legislative restrictions on	Jl 16; 422, 429, No 32, No 32A; 492		
Model changing criticized	No 18		
Refrigerator			
REFRIGERATOR MOTOR-TRUCKS	No 14; 457		
Design details	457		
Refrigerating system			
Absorption type	No 15		
Carbon dioxide	458		
Ice	458		
Location	No 14; 460		
Mechanical			
Cost	No 14, No 15		
Design details	No 14; 459		
Temperature regulator	No 14; 460		
Weight reduction necessary	No 15		
Weight			
Legislative restrictions on	Jl 17; 425, 432, No 32		
Payload relation to	No 18		
Width, legislative restrictions on	Jl 16; 421, 427, 492		
(See also Bodies, Motor-Truck; Brakes, Motor-Truck; Engines, Motor-Truck; Fleet Operation; Motor-Truck Operation and Performance, and Six-Wheel Vehicles)			
Motor-Truck Operation and Performance			
CONTROL OF MOTOR-VEHICLE TRANSPORT OPERATIONS	No 17, 436		
Axle loading, legislative restrictions on	Jl 17; 423, 424, 432, No 32; 492		
Canadian, legislative restrictions on	No 15		
Control efficiency factors	No 18, 436		
Costs			
Maintenance effects	436		
Trailer compared with	Jl 13; 319		
Economics of	437		
Field for	425		

Abbreviations Used: Ag—August Journal news section; De—December Journal news section; Jl—July Journal news section; No—November Journal news section; Oc—October Journal news section; Se—September Journal news section.

PAGE		PAGE		PAGE		PAGE
No 28	Production (Concluded)	No 22; 564	S.A.E. (Concluded)	No 32G, No 33; De 20		
Jl 29	Die improvement needed	Jl 30; Oc 11	Notes and Reviews	Jl 40; Ag 26; Se 26; Oc 32; No 38; De 28		
423	Zinc alloys		Officers, nomination of	Oc 16, Oc 20		
425	Engine		Professional Activities			
15, 444	Castings vs. pressed and welded structures	467, 468	Motorcoach and Motor-Truck	388; No 13, No 28; De 27		
No 32D	Structural variations in	385; 467, 468	Nominating committees	Oc 31		
No 32D	Engine, Diesel, cost	De 20	Production	Oc 12; No 22, No 24		
19, 436	Equipment		Transportation and Maintenance	395; No 13		
436	Economic selection	Oc 11	Vice-presidential nominees	Oc 16		
436	Maintenance and purchasing policies	No 27	Publications			
436	Gear improvement desired	465, 466	Journal	De 16		
436	Glass	De 19	Journal Index	Jl 32		
436	Labor problem		Papers, outside publication of	Jl 32		
436	Hours per week	No 29	Transactions	Se 20; Oc 18, Oc 20		
436	Machine replacement of	No 29	Research			
436, 437	Machining, tungsten carbide tools used in	Oc 12	Diesel-engine fuel	Jl 26, Jl 28		
317, 322	Piston weight variation	386; 465	Headlighting	Jl 28		
Oc 15	Screw thread accuracy	Oc 25	Lubricants, extreme-pressure	Jl 27		
444	Standardization, metric conversion factor	No 26	Riding-qualities	Jl 29		
De 27	Structural variations in	385; 467, 468	Traffic control	Jl 28		
Oc 15	Tires, pneumatic motor-truck	443	Wheel alignment	Jl 29		
	Valve and valve-gear improvement desired	385; 465, 466, 467, 468				
Jl 15	(See also Tools and Welding)					
Jl 15						
No 13						
457	Racing, Automotive, Rules	Jl 35				
29; 423	Rail-Cars					
425	Makes, Michelin	442				
5, Oc 27	Tires, pneumatic	444, No 32B				
422, 430	Research					
De 27	College, industry's relation to	468				
No 32B	Iron alloy	383				
423, 424	Philosophy	No 32H; De 16				
423	Riding-Qualities					
No 32B	Aircraft, wobblemeter measurement of	454				
423	Research	Jl 29				
No 32B	Tire effects, super-balloon	Jl 23; 403, 404, 407, 410; 441				
423	Wobblemeter measurement of	454				
No 32B	Roads and Streets					
423	Construction cost, taxation as source of	Oc 15, Oc 27; No 20, No 32; De 27				
439, 443	Impacts					
423	Research	Jl 29				
443	Road roughness effects	423, 424				
440	Six-wheel vehicle reduction of	387				
440	Speed effects	422, 423				
423	Stresses caused by	423				
Oc 15	Tire effects					
436, 437	Balloon vs. high pressure	422, 424				
	Cushion, pneumatic and solid compared	423				
3; De 18	Lighting					
3; De 18	Cost	Jl 25; 343, 344				
3; De 17	Research needed	Jl 24; 342				
3; De 18	System suggested	344				
Engines, and Con-	Stresses					
	Impact effects	423				
	Tire effects, high pressure vs. balloon	424				
	Surface					
	Roughness, impacts affected by	423, 424				
No 36	Thickness, motorcoach and motor-truck					
438	requirements	Oc 15, Oc 27				
No 36	Tire tread life affected by	443				
	Traffic control research	Jl 28				
	Wear					
	Motor-truck and passenger-car compared	425				
	Traffic effects	434				
20; 323						
324	S.A.E.					
324	Committees					
Jl 30	Automotive Transport Code	Jl 16, Jl 36; No 13				
	Military Motor-Transport Advisory	Jl 18; No 13				
325, 326	Motor-Truck and Motorcoach Rating	Jl 15; No 13				
	Nominating	Oc 25; De 21, De 22, De 25				
325, 326	Research	Jl 26; No 29				
323, 326	Council meeting	Jl 36; Oc 18; No 29				
325	Employment service					
	Se 20; Oc 17, Oc 20; No 23, No 24; De 15, De 16					
324	Finances	Jl 29; Ag 16; Oc 18				
325	Meetings					
323, 326	Aeronautic	Jl 32; Ag 11, Ag 16; Se 11, Se 20				
386; 465	Aeronautical Chamber of Commerce cooperation	Jl 32; Ag 11, Ag 16; Se 24				
413	American Society for Steel Treating	Ag 12; Se 13; Oc 12				
	cooperation	Ag 12; Se 13				
385; 467	American Society of Mechanical Engineers	Oc 20; De 11, De 16				
Oc 26	Annual	Oc 20; No 24, No 29; De 11, De 16				
9; Oc 26	Annual Dinner	Oc 20; No 24, No 29; De 11, De 16				
304	Production	Ag 12, Ag 16; Se 13, Se 20; Oc 11, Oc 20; No 22				
No 32F	Sections cooperation	Jl 32; Ag 11, Ag 13, Ag 16, Ag 21; Se 16, Se 20, Se 24; Oc 12, Oc 20; No 11, No 15				
465, 466	Summer	Jl 11, Jl 32				
331, 334	Transportation	Jl 32; Ag 13, Ag 16; Se 16, Se 20; Oc 20; No 11				
467, 468	Membership					
386, 465	Applicants for membership	Jl 39; Ag 25; Se 25; Oc 31; No 29, No 37; De 27				
385, 467	Applicants qualified	Jl 38; Ag 24; Oc 18, Oc 30; No 29, No 37				
Jl 34	Campaign for increase of	Jl 29, Jl 32, Jl 33; Ag 14, Ag 16; Se 19, Se 20; Oc 19; No 30; De 14				
Oc 14	Obituaries	Jl 35; Ag 22; Se 24; Oc 28; De 24				
467, 468	Personal notes	Jl 37; Ag 23; Se 23; Oc 29; No 35; De 26				
9; Oc 26						
section;						

Abbreviations Used: Ag—August Journal news section; De—December Journal news section; Jl—July Journal news section; No—November Journal news section; Oc—October Journal news section; Se—September Journal news section.

INDEX TO VOLUME 31

15

PAGE		PAGE		PAGE
	Tires and Rims (Concluded)		Transmissions (Concluded)	
330	Unadaptability to present cars	Oc 28	Definition	265
335	Use of	Jl 23; 403, 406	Early history	265
326	Vehicle appearance affected by	403, 405, 410; 441	Eccentricity effects	276
316	Wear, tread	404, 410; 441	Foreign development	276
307, 315	Wheel weights affected by	406	Future	276
287; 338	Tractor	442, No 32C; De 21	Gearshifting, synchronized, incorporated with	267
Jl 26	Riding-qualities affected by	Jl 23; 403, 404, 407, 410; 441	Heavy commercial vehicle development	276, 277
Jl 25	Rims		Life of	266, 268, 276
Jl 26	Diameter	403, 404; 441	Location	265, 267
339, 340	Widths	403, 405	Lubricants and lubrication	
Jl 29	Roadability affected by	408	Design for, roller ratchet type	267, 276
Jl 27	Shimmy affected by		Requirements	268, 273, 276; Ag 17
323, 326	Balance	307	Standardization	Jl 30; Ag 17
310, 315	Carcass structure	313	Makes	
De 23	Inflation pressure	313, 314	Auburn	266, 267, 271, 272, 274, 276
469	Super-balloon	417, 410, 411; 441, No 32F	Chevrolet	266, 271, 272, 273, 274, 276
266, 268	Shock-absorbers affected by	Jl 23; 407, 411	Chrysler	Jl 21, 269, 274, 275
453, 454	Sizes		Detroit Gear & Machine Co.	271, 274, 275; 338
310, 315	Increase in	439	Duesenberg	266, 272, 274, 276
Jl 29	Super-balloon	Jl 22, Jl 23; 403, 405; 440, 441	Haynes	265
8, No 32B	Skidding affected by	Jl 23; 410	Hudson	271, 274, 275
4, No 32B	Solid, impacts affected by	423	International Harvester Co.	265
423, 424	Speed affected by	407	L. G. S.	265, 267, 271, 273, 276
307	Spring design affected by	Jl 23; 411; 441	Lincoln	266, 268
440	Steering affected by	Jl 23; 403, 408, 410; 441	Millam	276; 338
307	Traction affected by	Jl 23; 409; 441	Nash	266, 274
423	Tread design, noise relation to	409	Oldsmobile	266, 271; 338
4, No 32B	Wear		Pierce Arrow	265, 266, 276
423, 424	Balloon, standard and super compared	404, 410; 441	Studebaker	265, 266, 268, 274
307	Road surface effects	443	Warner	266, 271, 272, 274, 275; 338
440	Six-wheel vehicle		Metals used in	
307	Factors of	396, 397, 401	Pawl and ratchet type	272
423	Inter-axle differential effects	395, 400, 402	Ratchet type	265
4, No 32B	Weight, unsprung, effects	Jl 20	Roller ratchet type	265; 384
4, No 32F	Wheel weight affected by	406	Cam design	267, 268, 276
443	(See also Aircraft Operation and Performance, Tires; Motorcoach		Development	Jl 21, 266, 272, 273, 274, 275, 276; 384
407	Operation and Performance, Tires; Motor-Truck Operation and		Lubrication	267, 268, 273, 276
422, 424	Performance, Tires; Rail-Cars, Tires; Six-Wheel Vehicles, Tires,		Rollers	
423	and Tractors, Farm, Tires)		Heat-treatment	272
4, No 32B	Tools		Loading	267, 268, 269
404	Boring, diamond and tungsten-carbide development	No 32F	Number of	Jl 21, 266, 267, 269, 270, 271, 276
409	Cylinder-boring	386; 465, 466, 467	Spinning	267, 269, 274, 276
438	Diamond	No 32F	Strength	269
423, 424	Grinding, brake-drum	465, 466	Spring clutch type	
422, 424	Machine		Capacity	272
408; 441	MANUFACTURING EQUIPMENT REQUIRED TO MEET		Development	Jl 21, 271, 273, 274, 276
439, 440	THE DESIGNER'S NEEDS	No 22; 465	Testing	266, 268
439, 440	Adaptability, increase in, desired	Ag 12; 386; No 22; 465, 467	Types proposed	384
438	Designers' cooperation needed	386; 465, 467, 468	Usage extent	Jl 21, 265
423, 424	Fixed center criticized	386; 465, 467	Gearshifting	
422, 424	Fixtures, steel as material for	No 22	Automatic, possibilities of	No 32E
423, 424	Improvements desired	465, 466	Synchronized, incorporated with free wheeling	267
444	Location holes, movable	386	Lubricants and lubrication, free-wheeling	
408; 441	Milling	465, 466	Requirements	268, 273, 276; Ag 17
439, 440	Selection, economic	Oc 11	Standardization	Jl 30; Ag 17
439, 440	Service, aircraft	329	Motorcoach and motor-truck	
439, 440	Standardization	Jl 36	Free wheeling	276, 277
4, No 32B	Tungsten carbide		Improvement desired	474
423, 424	Application of	Ag 12; Oc 11	Transportation, Railroad	
439, 440	Developments in	No 32F	Legislation influenced by	Jl 12
4, No 32B	Tractors, Farm		Motor-truck competition with	Oc 15
438	Power, tire effects, super-balloon	De 21	Trailers operated by	319
423, 424	Tires		U	
313, 314	Pneumatic	442, No 32C	Universal-Joints, Six-Wheel Vehicle Requirements	397; 487
410; 441	Super-balloon	442; De 21	V	
443	Tractors, Industrial		Valves and Valve Gear	
439, 443	USE OF TRACTOR EQUIPMENT ON THE MISSISSIPPI		Concentricity improvement desired	465, 466
409; 441	RIVER LEVEES	300	Production improvement desired	385; 465, 466, 467, 468
2, No 32B	Design requirements	De 21	Structural variations	385; 467, 468
27, Oc 28	Dirt removal	300	Timing effects, indicator diagram of	368
313, 314	Hours per year in operation	302	Vibration	
439, 440	Levee construction with	300	Aircraft	
422, 424	Maintenance	302	VIBRATION OF INSTRUMENT-BOARDS AND AIRPLANE	
408; 441	Trailers		STRUCTURES	Ag 11; Se 11; 445
439, 440	THE USE OF TRAILERS WITH MOTOR-TRUCKS	Jl 12; 317	Instruments	
408; 441	Aluminum used in	320	Examples	448
409; 441	Couplings		Mounting effects	449, 450
408; 441	Functions	Jl 13; 322	Measurements of	454
4, No 32F	Standardization	Jl 12; 317	Sources	454
405	Definition	321	Testing	446, 453
410; 441	Design improvements	319	Automotive, tests of	310, 315
404	Examples of use	Jl 12; 318, 320, 344	W	
409; 441	Factors affecting use	Jl 13; 318, 321	Welding	
410; 441	Haulage costs reduced by	429	Brake drum	331
404	Length, legal restrictions on	317, 322	Frame	465
409; 441	Number in operation	Jl 12; 319	Plating as finish	413
410; 441	Railroad relation to		Wheels	
404; 441	Semi-trailer	Jl 12; 317	Aircraft	
403, 405	Definition	398	Maintenance design requirements	327
408	Six-wheel vehicle compared with	429	Swiveling tail wheel	414
1, No 32F	Tractor combination, unit or dual vehicle	429	Alignment	
407; 411	Trains, legislative restrictions on	Jl 16; 318, 322; 422, 429, No 32, No 32A; 485, 492	Measurement methods	Jl 29
440; 441	Weight, legislative restrictions on	435	Research	Jl 29
42; De 21	(See also Bodies, Trailer; Brakes, Trailer, and Legislation, Trailer)		Future types predicted	No 32F
	Transmissions		Weight	
	Free wheeling		Shimmy affected by	313
	FREE-WHEELING DEVICES AND THEIR CONTROL	Jl 21; 265; 338; 384	Tire relation to	406
	Backward-rolling prevention	276	Wood	
	Bearing design	275	Body use	304
	Control methods	266, 274, 276	Decay prevention, chemical means of	304
			Sound and shock absorption by	304

Abbreviations Used: Ag—August Journal news section; De—December Journal news section; Jl—July Journal news section; No—November Journal news section; Oc—October Journal news section; Se—September Journal news section.

January, 1933